

What is claimed is:

[Claim 1] An automotive head restraint assembly for use in an automotive seat assembly having a seatback defining a seatback plane, said automotive head restraint assembly comprising:

head restraint support member configured to extend from the seatback, said head restraint support member having at least one horizontal travel arm generally perpendicular to the seatback plane; and

head restraint inner structure engaging said at least one horizontal travel arm, said head restraint inner structure movable linearly to a plurality of positions along said at least one horizontal travel arm.

[Claim 2] An automotive head restraint assembly as described in claim 1, wherein said head restraint support member comprises a tubular support member, said at least one horizontal travel arm comprising a pair of horizontal travel arm each having two parallel side arms joined by an arced travel arm end.

[Claim 3] An automotive head restraint assembly as described in claim 1, further comprising:

plurality of engagement notches formed on said at least one horizontal travel arm; and

locking arm mounted to said head restraint inner structure, said locking arm biased to engage said plurality of engagement notches, said locking arm movable between a locking arm engagement position and a locking arm disengagement position, said locking arm disengagement position allowing said head restraint inner structure to be movable linearly to a plurality of positions along said at least one horizontal travel arm.

[Claim 4] An automotive head restraint assembly as described in claim 3, wherein said plurality of engagement notches comprises:

plurality of uni-directional engagement notches, said uni-directional engagement notches allowing said head restraint inner structure to be movable relative to said at least one horizontal travel arm in a single direction when said locking arm is in said locking arm engagement position.

[Claim 5] An automotive head restraint assembly as described in claim 1, further comprising:

locking arm mounted in rigid positional communication with said head restraint support member; and

cam assembly positioned between and in communication with said locking arm and said head restraint inner structure, said cam assembly forcing said head restraint

inner structure forward in response to rotation of said locking arm, said head restraint inner structure biased rearward against said cam assembly.

[Claim 6] An automotive head restraint assembly as described in claim 5, further comprising:

motor assembly in communication with said locking arm, said motor assembly controlling positioning of said head restraint inner structure relative to said at least one horizontal travel arm; and

controller in communication with said motor assembly.

[Claim 7] An automotive head restraint assembly as described in claim 6, wherein said head restraint support member comprises a hollow tubular support member, said controller in communication with said motor assembly by way of a wiring assembly positioned within said hollow tubular support member.

[Claim 8] An automotive head restraint assembly as described in claim 1, further comprising:

travel channel formed through said head restraint inner structure, said at least one horizontal travel arm positioned within said travel channel, said travel channel engaging said at least one horizontal travel arm such that said head restraint inner structure is constrained into linear travel along said at least one horizontal travel arm.

[Claim 9] An automotive head restraint assembly as described in claim 3, wherein said locking arm includes a locking blade, said locking blade movable within a guide channel formed in said head restraint inner structure, said locking blade engaging said plurality of engagement notches when said locking arm is in said locking arm engagement position.

[Claim 10] An automotive seat assembly comprising:

seatback defining a seatback plane;

head restraint support member configured to extend vertically from said seatback, said head restraint support member having a vertical extension portion extending generally parallel to said seatback plane and at least one horizontal travel arm generally perpendicular to said seatback plane, said vertical extension portion positioned between said seatback and said at least one horizontal travel arm; and

head restraint inner structure including at least one travel channel, said at least one travel channel engaging said at least one horizontal travel arm, said head restraint inner structure movable linearly to a plurality of positions along said at least one horizontal travel arm.

[Claim 11] An automotive seat assembly as described in claim 10, wherein said head restraint support member comprises a tubular support member, said at least one horizontal travel arm comprising a pair of horizontal travel arms.

[Claim 12] An automotive seat assembly as described in claim 10, further comprising:

plurality of engagement notches formed on said at least one horizontal travel arm; and

a locking arm mounted to said head restraint inner structure, said locking arm biased to engage said plurality of engagement notches, said locking arm movable between a locking arm engagement position and a locking arm disengagement position, said locking arm disengagement position allowing said head restraint inner structure to be movable linearly to a plurality of positions along said at least one horizontal travel arm.

[Claim 13] An automotive seat assembly as described in claim 12, wherein said plurality of engagement notches comprises:

a plurality of uni-directional engagement notches, said uni-directional engagement notches allowing said head restraint inner structure to be movable relative to said at least one horizontal travel arm in only a single direction when said locking arm is in said locking arm engagement position.

[Claim 14] An automotive head restraint assembly as described in claim 10, further comprising:

a plurality of engagement notches formed on said at least one horizontal travel arm; and

a locking arm mounted to said head restraint inner structure, said locking arm including a gearing assembly engaging said plurality of engagement notches, said locking arm rotatable such that said head restraint inner structure to be movable linearly to a plurality of positions along said at least one horizontal travel arm in response to rotation of said gearing assembly.

[Claim 15] An automotive seat assembly as described in claim 14, further comprising:

a motor assembly in communication with said locking arm, said motor assembly controlling positioning of said head restraint inner structure relative to said at least one horizontal travel arm; and

a controller in communication with said motor assembly.

[Claim 16] An automotive seat assembly as described in claim 15, wherein said head restraint support member comprises a hollow tubular support member, said controller in communication with said motor assembly by way of a wiring assembly positioned within said hollow tubular support member.

[Claim 17] A method of providing linear fore/aft motion to an automotive head restraint assembly comprising:

mounting a head restraint support member to a seatback, said head restraint support member having at least one horizontal travel arm generally perpendicular to said seatback plane;

mounting a head restraint inner structure to said head restraint support member such that a travel channel formed in said head restraint inner structure engages said at least one horizontal travel arm, said head restraint inner structure movable linearly to a plurality of positions along said at least one horizontal travel arm.

[Claim 18] A method of providing linear fore/aft motion to an automotive head restraint assembly as described in claim 17, further comprising:

locking said head restraint inner structure in one of said plurality of positions utilizing a locking arm mounted to said head restraint inner structure, said locking arm engaging one of a plurality of engagement notches formed on said at least one horizontal travel arm.

[Claim 19] A method of providing linear fore/aft motion to an automotive head restraint assembly as described in claim 17, further comprising:

moving said head restraint inner structure through said plurality of positions utilizing a locking arm mounted to said head restraint inner structure, said locking arm including a gearing assembly engaging a plurality of engagement notches formed on said at least one horizontal travel arm; and

rotating said locking arm to move said head restraint inner structure relative to said at least one horizontal travel arm.

[Claim 20] A method of providing linear fore/aft motion to an automotive head restraint assembly as described in claim 19, further comprising:

rotating said locking arm using a motor assembly in communication with said locking arm; and

controlling said motor assembly utilizing a controller in communication with said motor assembly.